man state, there is considerable evidence indicating that the injury exerts its effect by increasing the permeability of the pulmonary capillary endothelium, thereby allowing fluid to escape initially into the interstitial space and subsequently into alveoli. The increase in pulmonary capillary permeability grossly alters the relationships of the forces that govern fluid movement across the capillary wall. Under these conditions, any increase in the hydrostatic pressure within the capillary causes more fluid to escape from the capillary. Consequently, the fluid management of patients who either have ARDS or are at risk of ARDS developing is of critical importance. Fluids should be carefully administered keeping clear-cut end points in mind, the volume administered being just sufficient to restore or maintain critical organ perfusion with as little increase as possible on the pulmonary capillary (wedge) pressure. (The house staff at San Francisco General Hospital Medical Center have accused us of forcing them to "sneak in at night" to give their patients fluids. We do not deny the accusation.) It should be emphasized that as a guide to fluid replacement in this situation, measurements of central venous pressure are inadequate and frequently misleading. Measurements of cardiac output and pulmonary artery wedge pressure provide much more immediate and accurate information on the need for and effects of fluid administration. However, in many hospitals these are not readily available; therefore, one should rely on other indexes of the state of perfusion including urine output, skin temperature, central nervous system function, blood pH and blood lactate concentrations.

Our current understanding of the pathophysiology of ARDS provides another important approach to prevention and treatment. This is the use of continuous positive pressure ventilation (CPPV). There are more than ample data to document the usefulness of this pattern of mechanical ventilation in patients who have ARDS. Continuous positive pressure ventilation exerts its effect by increasing the volume of gas in partially inflated alveoli or by reinflating collapsed alveoli (or both). Again, by an analysis of the forces acting across the capillary wall it seems logical that early intervention with mechanical ventilation using CPPV may be of some preventive value by lessening the effect of a given injury. By maintaining alveolar inflation, intraalveolar surface tension is reduced. This should lessen the negativity of the hydrostatic pressure in the pericapillary interstitial space and thereby decrease the pressure gradient between capillary and interstitium. Such a prophylactic effect of CPPV is suggested by two studies showing that in animals ventilated with high tidal volumes the addition of positive end expiratory pressure tends to conserve surfactant and thereby reduces alveolar surface forces[6] and also prevents pulmonary edema.[7]

Although there are still many unanswered questions concerning acute pulmonary injuries, there is at our disposal sufficient information to guide effective supportive care. In addition, there are many situations in which one can anticipate the risks of ARDS and apply the principles of supportive care in a preventive fashion. We await with eager anticipation the revelations that will allow the application of specific curative measures.

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Medicine in Ponape

THE EXPERIENCE of a medical resident in Ponape described elsewhere in this issue serves to draw attention to the sharp differences between medical practice where all the modern resources are available and where they are not. It also emphasizes what it may take to make them available and used appropriately in medically backward areas.

Some similarities between medical practice in the United States and in Ponape stand out with clarity. Patients do not always volunteer all the appropriate information. They may not understand what a physician is asking them or telling them. Cultural attitudes and beliefs may be as

important in patient care in the United States as in its trust territories. And clinical acumen remains a sine qua non to be cultivated by every doctor no matter what the specialty or where the practice.

Medicine in Ponape in many ways may be backward but it can teach something not only to a medical resident, but to physicians everywhere.

—MSMW

Management of Asthma

ASTHMA has been defined as "recurrent episodes of wheezing or dyspnea characterized by a significant increase in resistance to air flow. Spontaneously or following treatment, periods of complete or almost complete freedom from symptoms occur accompanied by a substantial decrease in resistance to air flow."[1]

Therefore, today we recognize that asthma is a complex group of symptoms and signs caused by one or several mechanisms and triggered by many factors. Spector and associates[2] describe subdivisions of asthma based primarily upon responses to various modes of treatment. A classic, and I think still useful, subdivision is intrinsic, extrinsic and mixed asthma.

Intrinsic asthma refers to reversible bronchospasm usually with infections that occur in nonatopic persons with no family or personal history of allergy and negative findings on skin tests and other immunologic and physiologic tests with specific allergens. The onset of intrinsic asthma commonly occurs in adulthood and the category includes most adults who have asthma.

Extrinsic asthma most commonly occurs in children, usually associated with other allergies, rhinitis, eczema, serous otitis, gastrointestinal symptoms, a positive family history of allergy or positive skin and other tests with specific allergens.

Mixed asthma refers to reversible bronchospasm that occurs in atopic persons but is unassociated with specific allergens. Obviously, there is much overlap among these groups, but the divisions are useful in anticipating possible responsiveness to therapeutic measures.

The first approach to a patient with asthma is to determine whether atopy and specific allergens are involved. The history of attack onset upon inhalation or ingestion of specific allergens, family or personal history of other allergies, and exposure to common known allergens should provide an index of suspicion that may be confirmed by skin and laboratory tests. If a test of total serum IgE, as described by Hamburger in this month's Specialty Conference, shows an elevated level, this serves to confirm atopy although one must recognize that IgE antibody against a specific antigen is of primary importance. Indeed, an atopic asthmatic person may have normal total serum IgE level and a notably elevated IgE-RAST* to a specific allergen. Furthermore, serum IgE antibody titer per se is merely a mirror of shock organ target tissue IgE antibody which, although currently not measurable, determines allergic status because the allergic reaction occurs in this tissue. The ultimate proof that an allergen causes asthma is by allergen inhalation or ingestant provocation of measurable symptoms or signs, for example, a 15 percent drop in forced expiratory volume in one second (FEV_1) or peak expiratory flow rate (PEFR).

In such an asthmatic patient, removal of all the inciting allergenic inhalants or ingestants by environmental control or elimination diet, respectively, should be successful in controlling symptoms. Great success has resulted from the removal of a pet dog or cat from the home of such a sensitive person. Furthermore, no amount of other therapy is successful if the offending allergen is not removed. Rackemann[3] reviewed his 20 years of practice experience and cited failure to insist on removal of a pet animal in the case of a dander allergic asthmatic patient as the chief cause of failure in treatment of asthmatics. Where complete removal of the allergen is impossible (as with pollens, molds and house dust mite), altering the patient's immune status with immunotherapy may be successful. Because the clinical course of asthma by definition is reversible, it is most difficult to evaluate long-term treatment such as immunotherapy on a double-blind basis to show a statistically significant improvement. Lichtenstein[4] recently outlined these difficulties. However, D'Souza and co-workers[5] did show statistically significant improvement ($p<0.05$) of wheezing and cough, drug use and inhalation tolerance to dust in a group of 45 house dust sensitive asthmatic persons undergoing immuno-

*RAST stands for radioallergen sorbent tests. Antigen is coupled to a solid phase immunosorbent and reacted with serum from an allergic person with IgE antibodies to the antigen. This complex is reacted with radio-labeled anti-IgE and centrifuged. Radioactivity measured in the washed pellet indicates amount of IgE antibody to that antigen.